**77**

# Report on the third meeting of member state computing representatives 18-20 May 1983

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Member States Computing Representatives' meeting

held at ECMWF Headquarters, Shinfield Park, Reading,

from 18-20 May 1983.


INTRODUCTION


The third meeting of the Member States Computing Representatives took place at ECMWF from 18-20 May 1983 and was attended by Representatives from thirteen Member States.  The meeting was preceded by a one and a half day Technical Update meeting, at which there were eleven participants from Member States.

The meeting was scheduled to enable the Representatives to be informed of the Centre's large-scale plans for the next few years, particularly those which had just been approved by the Council at its seventeenth session, in April 1983. Changes within the Centre since the last meeting (October 1981) were reviewed and Representatives, on their part, were given the opportunity to give the Centre some information on the status of their computer equipment and some feedback on their experience in using the Centre's facilities

The programme of the meeting is attached as Appendix 1, the list of participants as Appendix 2.


Session 1 - ECMWF Computer Status and Plans - G-R. Hoffmann


This talk commenced with a survey of the recent changes in staff structure and responsibilities, which mainly result from the new projects which are now being developed.

The current configuration and service was outlined, with emphasis on the changes which had been implemented since the last meeting (October 1981).  It was explained that problems with the Regnecentralen company (arising from the company's change in policy) had led the Centre to consider the replacement of the NFEP equipment earlier than originally planned.  This subject will be discussed at the next session of the Technical Advisory Committee (September 1983).  The latest status of the network of Member States telecommunication lines was given.  Details of machine performance during 1982 were given and it was noted that downtimes for the Cyber 835, although rare, were rather long when they did occur.  The Centre is in the process of discussing with CDC the provision of better support.  It was reported that Cray on-site support continued to be very good.

As for the future, the next change in the system will be the replacement of the Cyber 175 with a Cyber 855, a machine of similar power but of new technology and architecture. Shortly after the installation of the Cyber 855, a Cray X-MP will be installed. In conjunction with the Cray X-MP, a new operational forecasting model will be developed to exploit the capabilities of the two CPUs to the full. The data handling project is also underway with staff preparing for the acquisition of an IBM 4341, and commencing the design of a more specialised meteorological archival and retrieval system (MARS). A local area network, CDC's Loosely Coupled Network (LCN), is being developed as part of the data handling/highway project. It is planned to have the whole system in trial operation by 1 January 1985.

G. Siegwart (Switzerland) asked the place of the Aydin within the Centre's plans.
- the Aydin will eventually become just one of the generally available graphics terminals. The programming language used by the Aydin, FORTH, is extremely cumbersome and has proved a major disadvantage to the development of the Aydin's capabilities. The possibility of changing to a CPM based language was being investigated as a possible means of developing the Aydin further. The Aydin was acquired in 1980, and this has proved very valuable in allowing the acquisition of graphics experience and expertise.

## Session 2 Member States' Status - all representatives

Each Representative spent up to 10 minutes describing his/her country's current configuration, their experience using the ECMWF system and plans for future usage of the Centre's facilities.

Belgium - L. Frappez

A UNIVAC 1100/81 with a Scientific Accelerator Module (SAM) and 1000 kwords central memory had been installed three weeks previously.

Peripherals available:  6 dual access disks (each of $3 \times 10^8$ bytes)
4 tape drives (1x800/1600bpi, 3x1600/6250 bpi)
3 offline Versatec electrostatic plotters
More than 10 VDUs
2 RJE stations
2 Tektronix
1 Apple II
1 IBM series I which is used for data acquisition and as backup for the General Communication Subsystem (GCS) link to the WMO GTS.

The UNIVAC is connected via the GCS and a 2400 baud modem to the WMO GTS communications centre at Brussels airport, and via an HDLC port in the GCS to ECMWF. The software to handle the ECMWF connection was written by Belgian weather service staff and 90% is in Fortran 77.

There are no Belgian projects currently run at the Centre, but the development of a 2-dimensional model for the study of convection using the finite elements method is planned very soon.

Denmark - P. Henning

Denmark has an RC8000, supported by 3 RC8301 machines (the equivalent of RC3600s), 2 being for general control and one, which uses modified NTS software, handling the ECMWF connection.

A program permanently running on the RC8000 automatically transfers the Centre's forecast into files, starts plots (CALCOMP) etc. The Centre's precipitation forecast is used for agricultural purposes. Forecast information is also received from the USA and may in the future be obtained from the UK Meteorological Office.

Files containing jobs can be sent directly to the Centre, output can be printed or put into another file.

Some experiments are run at the Centre, including a synoptic climatological program, and air pollution studies. Use is also made by the University of Copenhagen.

In their experience, allocations of Cyber resources are not adequate since they use more Cyber resources than Cray.

The Danish Meteorological Institute now requires a new machine to replace the RC8000, which is too slow for their own model. An attached processor is planned to run a LAM. It was noted that, contrary to the Centre's bad experience of Regnecentralen support, the Danish Meteorological Institute were well satisfied with the service they received.

Germany - H. Kirschner

The computer system of the German Weather Service is based upon three Cyber machines: a Cyber 76-14 which is used for the preparation of a forecast up to 6 days, a Cyber 173 and a Cyber 172 which are both connected to the telecommunications system. Problems are caused by the fact that a RC3600

handles both the ECMWF connection and the link to the GTS via the German meteorological service's telecommunication subsystem: long output queues of GTS data develop during the dissemination of the Centre's forecast. The situation is made worse by the poor reliability of the RC3600 NTS software, which breaks down on average three times per day.

Plans include the installation of a new vector computer and network in 1985/86. 2 front-end machines will deal with interactive and operational work respectively and another computer will be dedicated to graphics.

User Support services were praised, but problems in obtaining additional Cray manuals were reported. It was proposed that the Centre should supply additional manuals, if the Member States were prepared to cover the costs. A. Lea described the Centre's budgetary system, which effectively makes such repayments impossible, since all monies received by the Centre must be returned to the Member States, offsetting their annual contributions.

Questions:
- As last minute changes to the machine schedule cause inconvenience, could daily information on schedules be stored in the EMS mailbox?
  The Centre will investigate.

- Could a better format for the reply to the STATUS command be produced?
  The Centre will investigate.

- Could additional interactive working via the RJE be allowed, e.g. to kill a job?
  The Centre will investigate.

- Could interactive working be allowed in general?
  This question is being addressed by the Technical Advisory Committee and Council, the next Technical Advisory Committee meeting (September 1983) will discuss it in depth.

Spain - M. Hortal

Spain has two very old IBM 360/40 machines. An IBM System 7 is linked to the GTS and to the IBM 360/40 by the medium of paper tape. A Cyber 18/20 handles communications to the Centre, at present with a 2400 baud line and a Versatec plotter. Spain may request that its line be upgraded to 4800 baud in October this year. They are in the process of planning to change their whole system of machines, but an ITT has not yet been issued.

The Centre's resources are used for ALPEX related projects, finite element models and statistical verification programs (Product Development). It is planned to continue these projects in the future. Problems caused by GMT machine schedules were mentioned : Spain, being 2 hours ahead of GMT often has no access to the Cyber or CRAY for a whole morning. The link has been rather troublesome, investigations and discussions with P. Quoilin are continuing.

France - G. Couruol

France has two Cyber 835 machines, running under NOS level 531. They will progress to NOS 2.1 in the autumn. They have experienced no hardware problems with their 835s, which are used for the pre- and post-processing of meteorological data and graphics, handling Tektronix, an on-line Versatec pen plotters and the generation of facsimile charts. They are connected to the GTS via a CII 10,070 machine.

A Cyber 175 (160k central memory with 256k ECS) runs 24 hours per day, running 10 hours of operational forecasting and 14 hours of general research. At present, this machine is connected to the Centre via a Cyber 2550, but it is planned to switch the link to the 835.

No major problems have been experienced. The link appears to behave oddly on occasions with some cases of lost output, but the origin of the problem has not yet been established.

France, like Germany, reported problems in attempting to purchase manuals direct form the manufacturer, CDC in their case, and also asked whether the Centre might supply any additional manuals required by them.

They are now in the process of testing the CRAY-1 at the Ecole Polytéchnique, on which the national meteorological service has an allocation of 5½ hours per day, 4½ hours of which will be used for NWP. The Centre's computer system is now being used in preparation for their use of the time on that CRAY-1, but usage of the Centre's facilities will always continue, since only 1 hour per day will be available to the French Meteorological Service for research on the Polytéchnique CRAY-1

Ireland - D. Murphy

There has been little change in the Irish configuration since the last meeting.
2 PDP11/40 machines handle communications, including the ECMWF link.  A DEC
2050 is used for running a forecasting model and research.  There are 2 off-
line CALCOMP plotters and 3 colour graphics terminals for use by the
operational forecasters.  RJE to the Centre is from PDP 11/40 terminals, on
which users prepare their jobs, which are then stored in files for later
transfer.

The Centre's archives are currently being used for studies of model output
statistics.  Use is of the Cyber, rather than the CRAY.  In the future, it is
planned to run a baroclinic model and two others.

User advisory services were considered very satisfactory.  Germany's request
for better STATUS information was supported.

Italy - G. de Florio

The Italian meteorological service has two links to ECMWF: a 100 baud line to
the RC8000 and a 110 baud line from an Olivetti 485 directly to the Cyber, via
the Cyber 2550, for interactive access.  This arrangement was approved by
Council, temporarily for 2 years.  It gives the advantages of full interactive
access to the Centre's services, and independence from both the Italian
Meteorological Service's computers and the RC8000 for batch job submissions,
but these factors must be balanced against the following disadvantages:  low
throughput; the transfer of large amounts of data from ECMWF to Italy must be
achieved off-line by mail (on tape).

This link is satisfactory for program development, but once the production
phase has begun, it becomes difficult, and Italian scientists must visit ECMWF
to run the work.  With this system, it is unlikely that Italy will be able to
use its full allocation of computer resources.  The main problems experienced
have arisen from difficulties in transferring experiments from the Centre's
system to Italy's own machine, and the cumbersome access to ECMWF facilities:
old fashioned batch access; long distances between users and terminals within
Italy;  training, entailing visits to ECMWF is too expensive; limited RJE
availability, depending on 2 systems, (both the user system and the RC
system).

6

The Italian representative then proposed that these problems should be reported to the Technical Advisory Committee and suggested two possible solutions:

i)   The secondary channel might be used for interactive access via the Cyber (instead of for EMS);

ii)  two 2400 baud logical lines might be implemented, on one 4800 baud line, one linking to the RC8000 for RJE, the other to the Cyber 2550 for interactive access.

He also suggested that a teaching program might be available on the Cyber for Member States' use, however it was explained that no ready-made material is available and the cost of producing in-house material would be totally impracticable.

S. Orrhagen (Sweden) added that the possibility of interactive access had also been discussed in Sweden, and suggested that a third solution might be to use the RC8000 link direct.  T. van Dijk (Netherlands) pointed out that the limited number of terminals which could be so connected to ECMWF might cause problems; if several users wanted to work simultaneously, queues would develop; using a Member State's own interactive system, with an RJE link to ECMWF avoids this problem.

Netherlands - T. van Dijk

The Netherlands meteorological service has 2 Burroughs 6800 (MCP) machines with 6 Mbytes central memory and 1 Gigabyte disk capacity.  The systems run with Algol.  Various minis support plotters etc.  Graphics facilities include 5 Xynetics flat bed plotters (already five years old), 3 Versatec plotters (two 22" and one 11") and one Tektronix 4114 terminal.  They are about to replace the Xynetics equipment.

The RJE connection to ECMWF is via a B800 minicomputer and a 2400 baud line. Jobs are prepared on the B6800s, then transferred via the B800 to the Centre; output returns to disk or direct to the printer.  At present the Netherlands are using ECMWF's computer facilities for the following projects: a wave model, a LAM and a boundary layer model; the University of Utrecht is working on a statistical model and studies of the polar ice cap.

The Netherlands representative reported that they found the batch job turnaround from the Centre very good and considered the documentation service excellent.

Austria - G. Kandl

Austria has a Cyber 171 mainframe, running under NOS 1.4 with NAM. A Cyber 2558 handles communications, including the connection to ECMWF, via a 2400 baud line. A Cyber 18 handles synoptic data flow, and they are about to install four Honeywell HP mini computers for dealing with climatological data. Communications software developed in France is used for the link to ECMWF. The Centre's forecasts are used for plotting, output diagnosis, wind trajectories, prognoses, statistical studies and research. Austria has no first hand experience of using the ECMWF computers, but is involved in the Alpex and LAM experiments.

Switzerland - G. Siegwart

The Swiss metoerological office receives the ECMWF data dissemination from the German meteorological service via the GTS. It also receives German and American data by this means. An integrated system, based on a data bank, is planned to allow manipulation of all available data, irrespective of source. Invitations to Tender have already been sent out for both replacement hardware and software, a supplier will be decided in one year's time, with the new system planned to be in operation in 1986. There are no plans to use ECMWF resources, since the Swiss Meteorological office will have use of another computer within Switzerland, possible at ETH, Zurich.

Finland - T. Hopeakoski

The Finnish Meteorological Institute has a computer system based upon a Cyber 170-720, with two Cyber 18/20's for graphics and telecommunications, data acquisition being performed via the GTS from Sweden. The Cyber 720 is linked to ECMWF via the communications software developed in France with which the Finnish Meteorological Institute are very well satisfied. The ECMWF facilities are used for as NWP/CAS project and model output studies. More regional programmes are planned in the future. They have experienced no problems with their link to the Centre, and no output has been lost (in contrast to France's experience). The documentation provided is also considered satisfactory.

Sweden - S. Orrhagen

The Swedish meteorological institute has a dual processor Univac 1100/22. A RC3600 handles a link to the GTS, a 4800 baud line to ECMWF and a 1200 baud call-up line between the Meteorological Institute of the University of Stockholm and ECMWF. Batch output is sent either direct to the RC printer or to the Univac. GTS plotting is done in real-time by two HP1000 plotters.

Radar generated pictures are being developed at present,and an Invitation to Tender for a satellite processing system has been issued.

The Swedish delegate reported low usage of the ECMWF system, not only because it was a system unfamiliar to users but also, and more importantly, because of the lack of interactive access. He supported Italy in the proposals to allow interactive connections. The two projects using the ECMWF system are a LAM and cloud prediction studies by Stockholm University. It is planned to test a boundary layer model in the future.

United Kingdom - Dr. A. Dickinson

The United Kingdom Meteorological Office has a Cyber 205 with two IBM machines as front-ends: a 3081 twin CPU and a 370/158 which is about to be replaced. The IBM 3081 has 16 Mbytes central memory and twice the throughput of their previous IBM 195. A Control Data Loosely Coupled Network (LCN) links the system. An Argos 7000 handles the connection to the GTS and ECMWF. A two year project is now underway to allow RJE from Bracknell direct from the mainframe. In the meantime, while software for their system is being written, it has been agreed that a UT200 line be established direct to the ECMWF front-end Cybers. The ECMWF facilities are used for both research and development work, since heavy operational forecasting commitments on the system in Bracknell mean that turnaround during the day is far better at ECMWF. Projects being worked upon include a model intercomparison, and atmospheric diagnostics (using the Cyber only). In the future, forecasting research will continue, a general circulation model and geophysical fluid dynamics will be studied. It is anticipated that once the direct link from Bracknell has been established usage of the ECMWF system will increase greatly and become more varied.

Session 3 - Operational Service - Bruno Baumers

It was noted that the internal organisational structure within the Computer Operations Section remains the same, though there have been some staff changes.

Machine schedules

The current schedule of down-time for systems and operational purposes and preventive maintenance was given. The unavoidable delay in informing Member State users of unscheduled downtime was explained: in such an emergency the first priority of all staff is to correct the problem as quickly as possible.

For this reason the Member States were also requested not to telephone the Centre once a break-down has been established, since answering the telephone caused interruptions to the process of solving the problem.

## Local use of Centre facilities

Those intending to visit the Centre to use the computers were reminded of the importance of the procedure to be followed:

1. Inform User Support well in advance of the intended visit. This allows them to ensure that your visit does not clash with a scheduled interruption to services, or major demands on User Support services (courses etc.) and assures you of office working space. Be prepared to change your plans, if your proposed dates are not convenient to the Centre.

2. Sign the visitors book at the reception desk of the computer hall. This informs the operators of your presence at the Centre, thus avoiding wasted telephone calls to your home country should there be a problem with the running of your program.

## Remote use of Centre facilities

Some recommendations regarding remote use were given:

Should remote users need to send programs to be run at the Centre, tapes, rather than cards, should be sent. The phasing out of cards at the Centre is now almost complete.

Tapes to ECMWF should be labelled clearly. The name and address of the sender should be given, with a contact address if different. Information about the internal characteristics of the tape should also be given. The tape should be addressed to:

> Tape Librarian
> ECMWF
> Shinfield Park
> Reading RG2 9AX
> England.

Only those tapes classed as stranger tapes can be sent from the Centre. They must be issued with a slot number and VSN and labelled with the name, user identifier, telephone number and address of the recipient. Representatives

were reminded of the expense involved in despatching tapes by post, and asked to keep such requests to the absolute minimum.

## Communication with the Centre

Cyber console messages are effective for short messages to the operators. For longer messages, a telex works well if the operators are alerted to its presence by a console message (the telex machine is now remote from the operators).

COMFILE, which is inspected regularly by User Support during working hours, is a very efficient method of rapidly transmitting non-urgent messages of any length. Eventually, later this year, the EMS (ECMWF Message System) will provide the most comprehensive range of communications, via the NFEP.

## EMS

It is hoped that once EMS has been fully implemented and its use becomes common, it will provide the ideal solution to most communications requirements.

When a questionnaire was sent to Member States enquiring about their intended use of EMS, the following replies were given:

1. Method of implementation:

| | |
|---|---|
| low speed line | 2 |
| medium speed interactive facility | 9 |
| secondary channel 1A2/50 baud | 1 |
| secondary channel 1A2/100 baud | 1 |
| secondary channel 1A5/100 baud | 4 |
| | 15 |

2. Purposes for which EMS should be used:

| | |
|---|---|
| Information on the computer and forecast service | 15 |
| Technical requests/queries and replies | 11 |
| Official messages between ECMWF and a Member State | 8 |

(However, some Member States strongly opposed this last use).

It was confirmed that, as had previously been requested by representatives, information on scheduled machine down time will be sent regularly to EMS users, as their systems became operational.

## The status of the network

At present, the ECMWF telecommunications network has 12 medium speed lines, 7
at 2400 baud, 2 at 4800 baud and 4 low speed lines (100m or 50 baud). It was
noted that the Centre has now reached the limits of performance possible with
the present network hardware. There still remain problems to be solved:
problems with the protocol with some internal software and recently problems
with the buffer in the NFEP have been discovered. The solution of these
problems is delayed and complicated by Regnecentralen's lack of support for the
equipment they supplied.

## Problem tracing

A description was then given of the extensive measures taken at the Centre to
ensure that once a problem has arisen, it will always be recorded for eventual
investigation and solution. Methods include a computer log, in which all
problems and abnormal occurrences are noted, problem reports, in which
problems/bugs discovered by users are recorded for investigation by Systems
Section or manufacturers' personnel.

Each weekday morning a meeting of operations, user support and manufacturers'
staff allows a review of the previous 24 hours events and helps to ensure that
problems do not build up unnoticed. Regular status meetings with both Cray and
Cyber (fortnightly and monthly respectively) enables the Centre to follow, and
expedite if necessary, the progress made in meeting our requests.

## Session 4 - User Support Services - Andrew Lea

Comfile seems to be established as a very satisfactory and convenient method of
communication for many Member States, allowing the communication of lengthy
messages without excessive delay. The few Member States who have implemented
EMS are also finding this medium useful. Once the majority of systems are
operational and procedures for sending and receiving messages at the Centre are
well established, this should prove the best available method of communication
for most purposes.

G. de Florio (Italy) considered that alternative methods of training should be made available and noted the IBM self-training courses which have been found very useful in Italy. The Centre has investigated many training possibilities, but none are viable for the Centre's purposes. There is no available manufacturer produced material, since CRAY and CDC systems are not sufficiently widespread to warrant it. (CDC's PLATO system would provide the type of material required, but does not cover NOS/BE). The manpower and time required to produce our own self-training material in-house would be excessive (Plato estimates were 200 hours preparation for each one hour of course produced).

The introductory guide will be revised to provide a reorientation guide, and it is still hoped that Member States might send one or two individuals for training who could then train groups in the home service.

Mr. H. Kirschner (Germany) asked if the Centre had any intention of moving to NOS. An investigation of this possibility approximately 3 years ago showed that 25-35 man years would be required merely to accomplish the changeover with no substantial advantage gained over the present system.

G. de Florio (Italy) asked about the possibility of using the IBM machine - the IBM 4341 will not be available to users.

## Session 5 - Upgrading the CRAY 1-A to the CRAY X-MP - Neil Storer

The Representatives were given a history of the development of the CRAY X-MP from the CRAY 1-A via the CRAY 1-S. The general characteristics of the new machine were described - the dual processors with intercommunication registers for inter-CPU dialogue, the Input-Output Subsystem (IOS) and the Solid State Storage Device (SSD) - and the way in which the Centre intends to exploit these particular features. Performance figures from the results of various benchmarks were given, showing the way in which the optimum configuration was arrived at. It was noted that if one CPU was to break down, the other could continue running alone.

## Session 6 - Graphics - Peter Gray

It is not expected that Member States will make a great deal of use of ECMWF graphics facilities, as they should have adequate facilities of their own. However, this session was presented for general interest.

The Centre's existing equipment is based on two Versatec electrostatic plotters, four T4014 terminals and the Aydin colour display system. Software is based on a Contouring Package with only limited capabilities for basic graphics (points, lines, areas, etc.). A graphics plan has been drawn up to provide more comprehensive facilities, hardware being based on a VAX 11/750 which acts as a graphics mini computer, software being based on the ISSCO packages (DISSPLA, Tell-a-Graf, CUECHART etc.).

The VAX 11/750 was delivered in late 1982 and is now being developed to support several hardware devices, such as a high quality, but slow, pen plotter, replacements for the fast Versatec plotters, low cost colour graphics terminals etc. Currently the VAX has to take files from the Cybers by magnetic tape, next year these machines will be directly linked via the proposed data highway. Graphics metafiles can then be prepared on any machine and sent to the VAX, where they can be previewed and ultimately plotted.

The principal software for graphics will be the DISSPLA package from ISSCO. At present it is available on the Cybers (FTN4 and FTN5 versions) and the VAX, later it will also be on the Cray. This package meets all the requirements set out for graphics by the Centre, as it has many capabilities. In addition, a new contouring package (CONICON) from the University of Bath has been acquired and interfaced to DISSPLA. Its design has been based on an optimum algorithm for contouring, developed at that university.

Taken together, these new hardware and software systems will provide a substantial improvement to the Centre's graphical facilities.

In the ensuing discussion, various questions arose, as listed below:

The new graphics plan gives many benefits, but what is the Centre losing? - G. de Florio (Italy)

The following table summarises the positive and negative sides:

| Positive side | Negative side |
|---|---|
| 1. Device independence (metafile concept) allows easy introduction of new devices. | 1. Expensive to buy (but it has meant substantial saving in manpower compared to writing one's own software). |

| | |
|---|---|
| 2. Use of colour more easily available. | 2. CPU utilisation is higher. |
| 3. Device variety | 3. Cyber memory limited (no such problem on the Cray though) |
| 4. Quality improved | 4. As it is a new system, a learning process is necessary. |
| 5. Ease of use | |
| 6. Modular, thus new developments are quicker | |
| 7. Unified approach, meaning that one picture can be built up via several packages. | |
| 8. Fully supported by the vendors. | |

Low cost colour devices mean low resolution, transfer speeds can also be a limiting factor for higher quality, are these problems to you? - H. Kirschner (Germany).

The low cost devices will be used for previewing where low resolution is adequate. We are investigating transfer speeds to see if higher speeds and so higher resolution, can be provided.

Could dissemination products be sent in graphics form in the future? - J. Juega (Spain)

The problem in sending a graphical file is the factor 5 to 10 increase in data transmission of a raster file is sent. One possible solution may be to use the metafile idea, however, the GKS standard must be accepted before this can be considered.

Session 8 - Data Highway and Data Handling projects - P. Gray

These projects have 9 staff assigned to them and are expected to take 25-30 man-years of effort. In all, there are 4 components:

MARS (Meteorological Archival & Retrieval System)

CFS (Common File System)

IBM 4341 hardware and software

LCN (Loosely Coupled Network)

1.  MARS

This is to be a high level user interface to the meteorological archives, as
GETDATA is now.  It will handle meteorological data both from the operational
archives and research experiments.  The software will run in two parts.  One
part will be on the IBM system and will access the data required using CFS.
The other will run on the so-called worker machines (i.e. Cybers and CRAY)
performing any necessary mathematical transformations of the data concerned,
and providing the actual user interface.

2.  CFS

This is a file handling system developed at Los Alamos and successfully run
there for several years.  CFS has an excellent record of stability and
efficiency, and it is therefore hoped that it will serve the Centre well.  It
is a modular system, written in PL1, handling a hierarchy of storage media,
between which files are migrated according to various criteria.  At the Centre,
CFS will be used to handle 3 levels, which are (in order of increasing size but
decreasing accessibility):

    large disks - approximately 12½ Gbytes of storage
    cartridge mass storage - approximately 35 Gbytes of storage
    ½" magnetic tape system - 6 drives

Files will move on to the large disks initially, but later will migrate to
cartridge or tape depending on size, frequency of access etc.  It has been
confirmed that CFS will be able to handle the data storage load expected at the
Centre.  At the moment it cannot handle magnetic tape, but support for tapes
is being added into CFS by Los Alamos.

3.  IBM system

The configuration is based upon an IBM 4341 MO2 processor with 8 Mbytes of main
storage.  It is rated at 1.2 Mips which is roughly half the power of the Cyber
835.  As outlined above, it will handle disks, a cartridge storage system and
magnetic tapes.  The interface to all the other machines in the Centre will be
via LCN.  Delivery begins in October this year, and consists of 3 phases,
ending in September 1984.

Software is based on IBM's MVS/SP operating system, with TSO/E, Fortran, PL1,
Pascal and various utilities.  It is hoped to have a working initial
configuration available in late 1983.

4. __LCN__

LCN is a CDC product, based on a local area network with a basic transmission speed of 50 bits/second. The necessary protocol overheads plus activity in each main frame result in a transmission rate for user data which will be somewhat less than this. The LCN will be used to connect all the Centre's machines with the exception of the NFEP (however its replacement may eventually be connected to LCN). Hardware consists of two coaxial cables, with a NAD (Network Access Device) connecting each machine to the cables. Delivery begins later this year, and the complete system should be available by early 1985.

Session 9 - CLOSING discussion   (owing to practical difficulties, the timing of this session had to be brought forward)

Interactive facilities

The discussion on the question of providing access for Member States to the Centre's full interactive facilities began with G-R. Hoffmann reminding everyone of some of the original reasons why Council decided against it, namely:

- ECMWF was to provide "number crunching" power only, not a general computing service.

- Member States have their own (interactive) machines, and ECMWF did not intend to displace those services.

- ECMWF would need a bigger machine to provide those interactive facilities.

- Some Member State finance ministries might query why a Member State meteorological service needs its own facilities, when a complete service may be obtained from ECMWF.

All these reasons are still valid, however, the Centre has a positive attitude to this question, since a bigger user community could necessitate more powerful machines at ECMWF, which the Centre would be strongly in favour of. This question is largely political, and will be discussed by the Technical Advisory Committee and Council. Those who have strong feelings on this subject should talk to their TAC Representative. For the next Technical Advisory Committee Meeting (September 1983), the Centre will present a technical paper as to how general interactive access might be achieved.

17

H. Kirschner (Germany) felt that full interactive facilities are not needed immediately, but a few additional interactive commands (e.g. to kill a job, to track and monitor a job's progress) were more pressingly required.

G. de Florio (Italy) queried whether technical arguments should be used to stop a political project. The Centre uses its interactive service to speed up the work of its scientists, the same should be done for Member State scientists. Everyone will be entitled to increased number crunching resources with the X-MP, but some Member States will not be able to use them because of lack of access. Finally, Mr. de Florio stated that the meeting should support the provision of full interactive facilities, and should report as such to the Technical Advisory Committee. Mr. Hoffmann repeated that, technically, a service can be provided (although there are some boundary conditions attached by the PTTs): this is mainly a political issue, so TAC Representatives should be convinced of the case.

H. Kirschner (Germany) reiterated that it was not ECMWF's task to provide Member States with computer facilities, but only with a share of computer resources. To change this could lead to problems with various national governments. G. de Florio (Italy) stated that it was his belief that Computing Representatives should look after the proper use of all resources, and should press whenever possible for full facilities to be made available, to ensure that those resources can be fully used.

## Next meeting

All attendees were asked to comment on the value of Member States Computing
Representatives meetings, and on the frequency of possible future meetings.
Positions had not really changed since the last meeting, in summary:

- the meetings are very valuable, not only to keep abreast of Centre
  activities, but also to meet other Representatives and discuss common
  problems.

- Another benefit is being able to meet User Support Contact Points in
  person, in addition to regular contact via the RJE link.

- The Technical Update meeting (held just prior to the Member States
  Computing Representatives meeting) was considered a very good way of
  being brought up to date on technical matters at the Centre.

- These meetings help Representatives to keep informed of market
  developments.

- The day to day working of the Centre is now less a part of these
  meetings, as the User Support Contact Points deal effectively with all
  day to day issues, thus the priority of the meeting has changed.

- Future meetings should be held when necessary to coincide with major
  changes at the Centre.

Mr. Hoffmann concluded by stating why the Centre felt meetings to be important,
namely:

- ECMWF is very interested in Member State progress and plans, as these
  influence the Centre's plans.

- It is always valuable to obtain user comments on the service provided.

- Visiting Member States is quite difficult and expensive for Centre
  staff.

- 25% of number crunching is available to Member States, so their views
  are important.

- It is valuable to be able to correlate the plans of the Centre with
  those of the Member States.

Based on all this, G-R. Hoffmann suggested a suitable time for another meeting might be when the Data Handling and Data Highway projects have gone into trial service, which should be in early 1985.  Mr. Hoffmann then concluded the discussion session by thanking everyone for attending, and User Support for organising the meeting so smoothly.  He looked forward to meeting everyone again at a subsequent meeting.

## Session 10 - Systems Plans - C. Hilberg

The Cyber 175 will shortly be exchanged for a Cyber 855 and there will be a small increase in total disk capacity at the same time.  Benchmarks run by the Centre on an 855 show a small increase in throughput (between 2 and 5%), but for individual jobs the change in CP time used was seen to vary by ±1.5.  The reasons for this are:

different instruction speeds on the two machines;

no parallelism on the 855;

the cache memory on the 855.

Consequently specific jobs will see a change, sometimes quite large, in the computer units used when moving from the 175 to the 855.  However, averaged over many types of jobs, the total usage is expected to be the same.

Sometime in the summer the Centre will move to level 577 of NOS/BE.  This is required to support the new data highway (LCN), however, it should have no user impact.  One or two new features will be included, mainly in the area of CCL.

Fortran on the Cyber is available under FTN4 and FTN5, however CDC support for FTN4 (ANSI 66 standard) ceases this summer.  Although the Centre has no reason to believe that FTN4 will not continue to work for some time to come, new projects should always now be started under FTN5 (ANSI 77 standard) not only is it fully supported, but it also has many new valuable language features.

On the CRAY the next version of the operating system (COS 1.12) will be needed as soon as it is available, as will COS 1.13 (in the autumn).  These changes are required for the X-MP support.  COS 1.12 has had several parts completely rewritten and will therefore require a lot of testing.  It contains a new job scheduler which will be of good use at the Centre.

At the next release of CRAY Fortran (CFT 1.11) more vectorising and various "speed up tricks" will become available. Two new features which will mean recompiling all existing programs, are included; recompilation may be required with CFT .1.11, or CFT 1.12, or possibly both. More details will be known later.

In summary, over the next 12 months, users can expect one upgrade of NOS/BE followed, it is hoped, by a period of stability. However, on the CRAY there will be at least two changes to both COS and CFT to provide full X-MP support.

## Member State Computing Representatives' Meeting

### 18-20 May 1983

### PROGRAMME

| Session | Wednesday, 18 May 1983 | Speaker |
|---|---|---|
| | 1400  Welcome | Geerd Hoffmann |
| 1 | 1410  ECMWF's computer status and plans | Geerd Hoffmann |
| | 1500  BREAK | |
| 2 | 1530  Member States | |

Each Representative will be asked to speak
for a maximum of 10 minutes outlining their
Member State's involvement (actual or
planned) in the computer service at ECMWF.
This should include:

- own computer equipment

- description of RJE equipment connected
  to ECMWF

- projects run at ECMWF

- experience using ECMWF computers

- plans (involving ECMWF usage over next
  couple of years)

1745  COCKTAILS


### Thursday, 19 May 1983

| 3 | 0915  OPERATIONAL SERVICE | Bruno Baumers |
|---|---|---|

- schedules

- Member State services:  tapes,
  lineprinter & COM, plots, postal
  services

- network:  practical problems, future
  development

- messages (console, EMS, telex, phone)

| Session | Thursday, 19 May (continued) | Speaker |
|---|---|---|

1015  BREAK

4  1045  USER SUPPORT SERVICE                                    Andrew Lea

- Allocations and accounts
- Advisory
- Contact Points
- Documentation
- Libraries
- Visiting the Centre

5  1115  Upgrading the Cray-1A to the Cray X-MP          Neil Storer

1230  LUNCH     (During this lunch break, there will be
                an optional tour of the machine area)

6  1400  GRAPHICS                                               Peter Gray

- present service
- new software (DISSPLA, CONICON)
- new hardware (VAX)
- future plans

1515  BREAK

7  1545  Guest Lecture - "Recent developments in supercomputers"
                        by Tor Bloch
                (Ecole Polytechnique and CERN)
         This lecture will take place in the Lecture Theatre

1700  FINISH

Friday, 20 May 1983

8  0900  Data Highway and Data Handling Projects          Peter Gray

1010 BREAK

10  1040  Closing discussion

9  1145  SYSTEMS PLANS                                         Claus Hilberg

- Cray software  (COS, CFT)
- Cyber hardware (Cyber 855)
- Cyber software (NOS/BE, FTN4, FTN5)

1230  END OF MEETING

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## Member States Computing Representatives Meeting
### 17-20 May 1983

### ATTENDEES

| Member State | Name | Attendance at technical meeting 17/18 May |
|---|---|:---:|
| Belgium | Miss L. Frappez | X |
| Denmark | P. Henning | X |
| Germany | H. Kirschner | X |
| Spain | M. Hortal | X |
| | J. Juega | X |
| France | J. Bourdette | NO |
| | G. Couruol | X |
| Greece | - | |
| Ireland | D. Murphy | NO |
| Italy | G. de Florio | X |
| Yugoslavia | - | |
| Netherlands | T. van Dijk | NO |
| Austria | G. Kaindl | X |
| Portugal | - | |
| Switzerland | G. Siegwart | X |
| Finland | T. Hopeakoski | X |
| Sweden | S. Orrhagen | X |
| Turkey | - | |
| United Kingdom | A. Dickinson | NO |
| ECMWF | G-R. Hoffmann | |
| | P. Gray | |
| | C. Hilberg | |
| | N. Storer | |
| | E. Walton | |
| | A. Lea | |
| | S. Bernardi | |
| | J. Greenaway | |
| | N. Kreitz | |
| | P. Prior | |
| | J. Chambers | |
| | R. Gibson | |